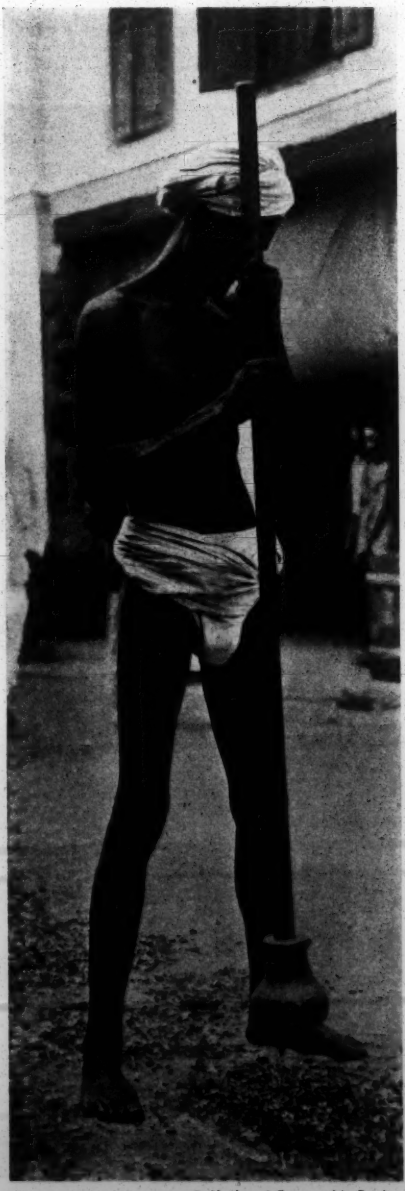

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MALAYA'S KIND OF STEAM ROLLER

The Malay produces wonderfully wrought objects in gold, silver, wood and ivory. His labor now is extensively utilized in supplying the world with rubber and tin (see Bulletin No. 4). The Malay usually is described as lazy, but if allowed to work in his own way he becomes a valuable asset. Many, like this street repairman, are employed in the government service. The utilization of native labor, both in Asia and Africa, is an important element in increasing world production of raw materials needed for manufacturing.

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HOW TEACHERS MAY OBTAIN THE BULLETINS

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Nanking, China: Where Americans Lived on a Dragon's Back

PERILS of American business and educational colonies at Nanking recently turned attention in the Far East to the old Ming capital, 200 miles northwest of Shanghai, storm center of the fighting.

Living on the humps of "a sleeping Chinese dragon" proved to be as hazardous for Americans in Nanking as it was for the Ming emperors who ruled China for a time from the same dragon's back.

Why the Site Was Chosen

Chu Hung Wo, first Ming emperor and builder of Nanking, stood on a hill not far from the present University of Nanking and looked along a line of low hills that undulate north for 5 miles to the shore of the Yangtze River. To him the hills looked like the sprawling body of the sacred dragon. Said he, "If I can build my capital on the dragon's back, it will last forever."

To-day the buildings of the University of Nanking, an institution in which four American Christian denominations joined forces to introduce Western education and Western ways, occupy one hump. The Standard Oil Company occupied another hump down by the "dragon's" head where it "sips of the Yangtze." The American consulate looted by soldiers stands also on the Nanking dragon's back but the native cities are at the head and tail.

Where the Yangtze Is a Mile Wide

Like Shanghai, Nanking lies south of the Yangtze, which is a mile wide at this point. And like Shanghai the main body of the city is not on the river. The railroad between the two cities has made Nanking, but in the last few weeks it has been its curse. A ferry connects the city with Pukow, across the river, the terminus of the railroad running north to Tientsin and the famous Shantung peninsula. The two rail lines, Shanghai-Nanking and Pukow-Tientsin, have put the Grand Canal, whose route they parallel, in commercial eclipse. Furthermore, they have dumped rice, eggs, wheat, peanuts, soy beans, and silk into Pukow and Nanking in enormous quantities for shipment to other parts of China or abroad.

But the fly in the ointment is this: Shantung troops defeated by the southerners are hurrying home. The railroad to Nanking offered their quickest route. But before the Shantungese could get transportation across the river to Nanking's sister city, Pukow, the Cantonese caught up with them. Americans and Europeans were isolated in the center of the resultant battle.

Once Was the World's Largest City

The railroad has built the city up from a lazy, side-tracked, sleepy provincial capital of 267,000 in 1910 to a metropolis of 400,000. Nanking has been swiftly growing to its walls which, about the time of Columbus, enclosed the world's largest city. The walls stand to-day, 500 years old and 32 miles in circumference, as a high water mark of Nanking's better days. They enclose the "dragon hills." They enclose also the native city which fills the plain south of the "dragon tail." Turnips grow and bamboo stalks wave where Ming and Manchu

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THE PRINCIPAL LANDMARK OF HYDERABAD, INDIA

Recent rulers of India's largest native state have erected buildings which have done much to beautify the capital. But no building is more highly regarded by the Moslem inhabitants of Hyderabad than the Char Minar, with its four towering minarets. It was constructed in 1591 (see Bulletin No. 3.)

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Flying Messengers from the World of Atoms

RECENT demonstrations of the remarkable effects of cathode rays when they are turned on various substances, demonstrations never before possible on such a large scale, have awakened interest in rays in general.

Cathode "rays" are rays only by courtesy. Like their swifter brothers, the beta-rays of radium and like their more distant relatives, the alpha-rays of radium, they are streams of flying particles. Thus these "rays" are much more like a sand blast or a jet of water than they are like beams of light or heat, or any other of the long gamut of electro-magnetic or so-called "ether waves." The nature of the latter, it will be recalled, cannot definitely be stated yet, but they are most generally supposed to be merely disturbances moving through "empty" space, as a ripple moves over a water surface, or a sound moves through air. They vary from the long Hertzian waves of radio to the inconceivably small Millikan or Cosmic rays.

Each Atom Is a Tiny Solar System

In order to understand the nature of the special "rays" or streams of particles, it is necessary to consider the nature of matter itself. It is now the generally accepted theory that each atom of matter is like an exceedingly tiny solar system. The central nucleus of the atom takes the place of the sun, and around it at varying distances revolve almost inconceivable small electrons taking the places of our planets in this little fairylike "solar system." These electrons are supposed to be tiny "pieces of electricity," negative charges. There is, it will be seen, much more space or "hole" in an atom than solid substance, considering both the (negative) electrons and the (positive) nuclei to be "solid."

The three kinds of "rays" under consideration consist of streams made up of fragments of atoms flying rapidly through space and even through the air. It can be easily understood, however, that such "rays" cannot fly far, even in a world of "porous" matter, without colliding with some of the countless billions of atoms that are all about us, and so being brought to a stop.

Particles Flow From Electric Terminal

The first of these strange "rays" known to exist were the cathode rays discovered by Sir William Crookes in 1875. They were found to come into existence when an electric discharge (or spark, like that of an automobile's spark-plug) was made to jump a gap inside a glass bulb or tube from which almost every vestige of air had been pumped—that is, inside a vacuum tube. At one point in the side or end of such a tube was sealed an entering wire for the electric current. Either the end of the wire itself, or a special knob or plate attached to the end, was exposed inside the tube. This is the anode, the point from which the electric spark "jumps off" in the tube. At a second point, not necessarily directly opposite, another metal terminal was placed. Attached to it was a second wire passing through the glass wall of the tube, and furnishing the outward path for the electrical flow. The terminal of this outward-leading wire (inside the tube, of course) is the *cathode*.

It is when an electric current of high voltage is passed through such a tube, the discharge or spark jumping from anode to cathode, that the remarkable cathode rays are produced. The rays must not be confused with the electric discharge itself. They are entirely distinct. They arise from the *cathode* or outlet for the electric current, and flow *back* into the tube. They are emitted at right angles to the surface of the cathode and so the shape of the "jet" can be controlled by varying the surface. If it is ball-shaped the rays fly off in every direction, if it is a flat disc, they move away in a cylindrical stream, and if it is cupped, the stream can be brought to a focus.

Imprisoned Like Genie in Bottle

Ever since Crookes' discovery of the cathode rays, our knowledge in regard to them has been confined almost entirely to their action inside their vacuum tube birthplace; for they will not penetrate glass of ordinary thickness. They will penetrate a very thin metal foil, however; and twenty years ago one investigator, Lenard, got a tiny beam of them through a "window" of aluminum foil about as big as a capital "O."

Except for such experiments with a weak little beam, cathode rays, for the half century since their discovery, have been imprisoned within their tubes like the powerful Jinn of Arabian Nights in their bottles. One of the most dramatic achievements of physicists in

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palaces rose, but each year sees more fields once more absorbed for houses and factories.

It was an old Ming emperor who organized the Chinese Civil Service system which dictated the educational standards of China until our time. Some old examination halls still stand in contrast with the new University of Nanking classrooms. Within the old examination halls are rows on rows of cubby holes, each about the size of a telephone booth.

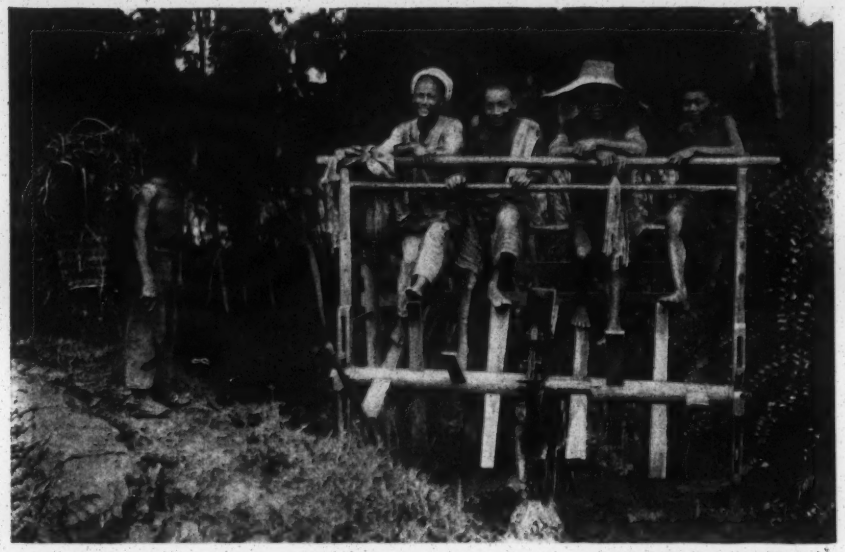
A "Civil Service Exam"

Often 10,000 young Chinese would offer themselves for examination for government positions. They voluntarily entered the booths to stay in solitude for three days, answering questions on Chinese history, and writing down from memory passages from Confucius and Mencius. Often students would be found dead in the booths after the ordeal.

The University of Nanking campus covers 80 acres and contains laboratories, lecture halls, dormitories, and faculty homes. University departments include colleges of arts, sciences, business education, nursing and medical schools, agriculture, forestry, schools for training missionaries and teachers, and a model school with kindergarten, primary and grade departments.

American business has also made direct contact with Nanking, as the central distributing point for American goods in what is known as the Nanking Consular District. This populous area demands five commodities from the outside world; cotton goods, kerosene oil, sugar, cigarettes and metal products. Chief vendor of three of these products, kerosene, cigarettes and metal products, is America. New China has put aside smelly, smoky, weak vegetable oil illuminants for kerosene from America.

Bulletin No. 1, April 25, 1927.



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THE FOOT THAT PLIES THE PUMP CONTROLS THE CROP IN MANY PARTS OF CHINA

The mechanical devices of China are numerous and ingenious. Frequently they seem queer to us because they require so many people to operate them. But it must be remembered that man-power still is the cheapest kind of power obtainable in many parts of the Republic.

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Hyderabad, the Texas of India

THE TRAVELERS who recently came back from India with the impression that the Nizam of Hyderabad is the richest man in the world, with wealth eclipsing the fortunes of American billionaires, may not be technically correct. But there are many potentates in India whose wealth is enormous, and uncounted, for there are no income tax returns to compel an exact accounting.

Hyderabad is one of the most independent native states of India, in the government of which the British have interfered only to a slight degree. With its 82,700 square miles, it is the largest in area of some 600 native states that, with the British territories, make up the Indian Empire. It is pushed very close for first place by Kashmir, which—thanks to the shawls our mothers wore—has gotten the greater publicity. The ruler of Hyderabad is the Nizam, and the state is as often referred to as "the Nizam's Dominions" as it is by name.

Subjects Are Mostly Hindus

Politically, Hyderabad is of great importance. The Nizam is the highest ranking Mohammedan prince of India, and his dominions are the heart of Moslem feeling and activity for the whole peninsula. Yet, by one of the strange quirks common in Indian affairs, the 11,000,000 subjects of this ruler are predominantly of the Hindu faith. This situation is reversed in Kashmir, where a Maharajah of the Sikh faith (built on Hinduism) rules over a populace almost wholly Moslem. Hyderabad is the gathering point for all Asia for the chief body of pilgrims to Mecca each year, and the expenses of many of the travelers are paid by the Nizam from his well-filled private coffers. This potentate ranks in the Moslem world very close to the kings of Egypt and Iraq.

The state of Hyderabad has a status not easily defined. The British Empire, through the Indian Empire, takes care of all foreign relations, and the Nizam undertakes to furnish certain troops for empire defense; but otherwise the state is almost as independent as Afghanistan or Persia. It mints its own money, runs its own postal system, has its own army, and maintains the other machinery of independent sovereignty. The Nizam lives amid all the splendor and seeming power of the Oriental potentate of tradition. His *zenana*, or "ladies' department," while not so extensive as Solomon's, comes closer to that of the Biblical king, probably, than any other existing harem.

Land of Golconda

The public finances of the state have often been in bad shape; but the Nizam's private wealth is tremendous. Doubtless that is to be expected, for before Hyderabad received its present name it was the kingdom of Golconda—a name which has become a synonym for fabulous wealth. From a Golconda diamond mine, it is said, came the Koh-i-nor, perhaps the most famous of the world's huge diamonds.

Hyderabad City, capital of the state, and chief residence of the Nizam, has a population of half a million and is the fourth city of India. Most of its habitations were once mud huts; but many have been rebuilt with brick during the last quarter century. The Nizam's palaces, those of the nobles, and numerous government buildings, all of stone, add to the present substantial appearance of the city. In the exact center of the walled area rise four lofty minarets,

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many years was the recent bringing of a powerful jet of cathode rays from "beyond the veil" of glass, out into the open air. This was done by Dr. W. D. Coolidge, who invented a giant tube with a modified cathode and a "window" of nickel foil three inches in diameter.

An electric current at 350,000 volts was discharged through the tube and a three-inch jet of cathode rays, made up of countless billions of electrons, hurtled through the "window" at a speed of approximately 150,000 miles per second—a velocity almost as great as that of light. This jet shoots out from the tube for some two feet into the air and may be played upon any substance with which it is desired to experiment. The tremendous bombardment by swift-flying electrons, never before possible on such a large scale, produces many strange physical and chemical results. Colorless stones are made to glow for hours as if red hot; certain gases and liquids are turned to solids; and wounds are made on animal and vegetable tissue.

Fly Between Molecules and Atoms

Apparently the reason for the production of cathode rays is that the high voltage electrical discharge tears the outer "loose" electrons from atoms and hurls them off along lines of force extending from the cathode. These tiny "pieces of electricity" are stopped by the thick glass but find the invisible spaces between the molecules and atoms and electrons of the thin nickle wall, and stream through. Collisions with the molecules and atoms of the air stop them within two feet from the "window."

In producing cathode rays we are tearing atoms to pieces—we are really breaking down matter. This particular splitting up of atoms, however, is not the source of power that some dreamers have seen in atomic disruption. A great deal more energy is used in sustaining the electric discharge in the tube than can be gotten from the electron stream that comes out of it.

It is interesting to note in passing that cathode rays are the creators of X-rays. These latter most useful, penetrating waves are born in a metal target in a vacuum tube when cathode rays strike the target. Unlike cathode "rays" the X-rays are not stopped by glass, but flow from the target through the walls of the tube out into the world of air and other matter.

Beta and Alpha-Rays of Radium

For more than twenty years after the first production of cathode rays, rays of this sort were unknown in a natural state. Such electron streams were thought to be wholly artificial. Only when electricity was discharged in a specially prepared vacuum tube were they known to exist. After the discovery of radioactivity in 1896 and radium itself in 1898, it was found that streams of electrons are given off naturally by the uranium-radium family of elements (along with streams of certain atoms and a highly penetrating "ether wave"). The electron streams from radioactive substances are exactly the same sort of "rays" as those from the cathode of a vacuum tube, but the naturally produced "rays" attain greater speeds. They are called beta-rays. Some of them move at speeds of 176,000 miles a second, nine-tenths the speed of light. Naturally they penetrate somewhat more deeply into matter than cathode rays.

The third "ray" which consists of a stream of particles is the alpha-ray from radioactive elements. In this case the particles are not the tiny electron satellites of atoms, but are atoms themselves. They are atoms of helium, one of the simplest atoms existing. These flying Mercuries of the atomic world come with a wonderful message for science, telling much of the invisible building blocks of the universe. They are thrown off apparently by a sort of explosion in the atomic heart of a radioactive element. One of the greatest secrets they disclose is that transmutation is a fact; that one element really can turn into another. The explosion leaves the original element somewhat changed in nature, while the helium atoms of the "ray" are stopped by collision with other atoms, and remain inertly mixed in the atmosphere or tangled in other matter.

Alpha-rays, or more properly alpha particles, do not move so swiftly as the smaller electrons of the beta-rays. They fly at speeds of between 10,000 and 12,000 miles per second, and penetrate into the air only between 1 and 3 inches. Since they are so much larger than beta particles they naturally are stopped sooner. Alpha particles are positively charged while beta particles are negative.

One does not need the facilities of a great laboratory in order to see the effects of the helium atoms sent flying from radium. Take a watch with luminous figures into a dark room and examine it through a simple microscope. It will be seen that the figures do not glow uniformly, but that on each there are numerous tiny flashes of light. The figures are covered with a paint made of one grain of radium mixed with enough zinc sulphide crystals to prepare 65,000 watches. The atoms of radium in the mixture, like radium atoms under all other conditions, explode and send out the helium atoms. Whenever one of these strikes a zinc sulphide crystal it makes a spark, just as a horseshoe does in striking a cobblestone. On a watch face about 200,000 such sparks flash per second. The activity of the radium will keep up for some 2,000 years, but the sparking goes on for only a few years because by that time the flying atoms smash all the zinc sulphide crystals.

Bulletin No. 2, April 25, 1927.

See, also, the Geographic News Bulletin No. 2, February 7, 1927, entitled "The Ray Family, Which the World Is Eager to Know." This bulletin and the one herewith given are complementary.

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Tin, the Only Important Metal Which the United States Does Not Produce

TIN SUPPLIES are reported to be diminishing, due largely to the increasing demand for tin cans.

Tin is the only important metal that is not produced in continental United States although this country consumes more than half of the world output of 145,000 tons a year.

Sixteen states are known to have tin deposits but none of them has a sufficient quantity for profitable exploitation. The first and largest deposits were found in southern California about ten years before that state was admitted into the Union. They were diligently worked from time to time for more than a half century but were finally deserted after a fortune had been lost in the diggings. Alaska is our only private source of tin, with an annual production of about 13 tons.

The Phoenicians Went to Cornwall for Tin

For centuries Cornwall, England, was the chief tin producing center of the world. As early as 1040 B. C., the Phoenicians are known to have obtained Cornwall tin for bronze casting. The tin trade led many Mediterranean ships to venture out into the Atlantic for the first time.

About thirty-five years ago Cornwall forfeited its reputation to the Federated Malay States which now produce about one-third of the world output of tin. While the Malay was satisfied with eking out his day-to-day existence, catching a few fish and growing a little rice, Chinese migrated there, braved the fever-infested swamps and jungles of the peninsula and neighboring islands, and developed the tin deposits. The palatial homes of Chinese tin "barons" in Malay towns attest what the metal has done for them.

Bolivia and Dutch East Indies Are Producers

Bolivia and the Dutch East Indies each produce a fifth of the annual output, with the South American country slightly in the lead. Nearly all the remainder is produced in China, Siam, India, Nigeria, Austria, Cornwall, Congo, South Africa, and Alaska.

Bolivia is believed to be the only tin producing country that is capable of materially increasing its tin production. Tin deposits cover a wide area of the country, but the llama is the only beast of burden available and, in fact, the only transportation facility, and development work has had to be confined to the most accessible localities. Even at the present rate of production, the tin mining industry is the source of a large per cent of the public revenue of Bolivia.

Tin Has Many Uses

Tin is a valuable and expensive metal but to the average layman 'tin' and 'cheap' are nearly synonymous. This is perhaps due to the misnaming of the 'tin' can. 'Tin' cans are really sheet steel cans with a thin coating, or about one-sixtieth part pure tin. It is the sheet steel that is cheap, while the small amount of tin is the can's most high-priced ingredient. The price of a pure tin can would be prohibitive for the ordinary uses of containers.

Tin is not hard and tough enough to be used alone, but alloyed with other

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spaced in a quadrangle, dominating the sky line. From these towers four broad streets run to the four quarters of the city. Over each, a short way from the towers, is a huge arch.

Mosque Shelters 10,000

The minarets are not connected with a mosque, but at a little distance from them is one of the largest temples of the Moslem world, the Mecca Mosque. Under the huge twin domes of this structure 10,000 of the followers of the Prophet may assemble.

In size, the Nizam's Dominions are almost exactly equal to that of Kansas; and as in that state some regions are comparatively arid. Kansas would have to be moved to southern Mexico, however, in order to lie in latitudes corresponding to those of Hyderabad. The country abounds in dry, rocky ridges and buttes, especially in the southern part. In that section the streams dry up in summer and water must be impounded in tanks. These small artificial lakes dot the entire countryside. On the black lands of the north and west cotton is grown.

Walled villages all over Hyderabad testify to the turbulent conditions that prevailed before English influence became established in India. Most of the populace are agriculturalists. Famines have been frequent, caused by a deficiency of rain in certain years. During some of these times of want hundreds of thousands of people have perished.

Bulletin No. 3, April 25, 1927.

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HAYSTACKS TIED TO TREES IN THE PADDY FIELD OF A SZE-CHUAN FARM

As the farmer needs hay he takes it from the bottom of the stack, permitting the weathered portion to remain. The embankment paths separating the fields are bordered with bean plants. Rice is the staff of life in China. Indeed because it is used by the hundreds of millions of people in China, India and Malaya, rice, not wheat, is the foremost grain crop in world production.

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Borneo: Where Head-Hunting Still Survives

HEAD-HUNTING still survives in Borneo, according to an American Expedition which penetrated unexplored jungles to search for little known native tribes.

In discouraging the savage custom of head-hunting the Dutch and British rulers of Borneo recently enlisted the powerful cooperation of native priests or "medicine men." At one assembly of thousands of the natives, or Dyaks, a terrible curse was pronounced by the head priest on all who revive tribal quarrels.

The curious custom of head-hunting has been in existence in many of the islands of the East Indies for ages. It is not confined to any one people but is practiced by the Dyaks in Borneo, other Malays in the smaller islands, and by the negroid Melanesians in New Guinea.

How Women Help Keep Custom Alive

Human heads are the most highly prized possessions of the head-hunters, and the women of the tribes help to perpetuate the custom by favoring the young men who collect the most grim trophies. Not only are the heads of enemies obtained in major warfare, but the young braves of one village will often attack a neighboring village merely for the purpose of obtaining heads. The heads are preserved and dried and hung over the owner's fireplace, the collections being handed down from father to son.

Under British and Dutch rule many of the Dyaks of Borneo have become peaceable farmers. This is especially true along the coasts and near the navigable rivers. But from time to time the more savage natives of the interior revert to head-hunting, and they have found the semi-civilized agricultural natives a source for heads. It is to protect this farming people and to extend civilization more widely through the island that the aid of the "medicine men" was enlisted.

The Dyaks live in "long houses," each of which shelters many families and is in effect a village in itself. Some of the horizontal ridge-poles of these structures, raised 30 to 40 feet in the air, extend for several hundred feet. From the ridge-poles the thatched roof sweeps down at a steep angle to within six or eight feet of the ground. This is the floor level, the houses being constructed on a platform supported by piles. Outside, the roof is an open veranda, an uncovered extension of the floor platform. Under the roof on one side of the center is an enclosed veranda extending the full length of the communal house. On the other side of the center the space is divided by partitions into rooms for the various families. In the enclosed veranda, outside the rooms, are the individual fireplaces over which the treasured head-racks are placed.

Dyaks Wear Garments of Brass

The Dyak men are smaller than the average Westerner, well proportioned, and of a type adapted for activity, speed and endurance, which are valuable qualities in jungle inhabitants. The women affect a queer method of adornment, wrapping themselves in brass corsets made of numerous hoops of cane covered with brass rings. These metal garments cover their bodies from just below the arm pits to the hip line, and even below. Heavy necklaces and ear pendants

metals it plays an important part in man's life. If he sleeps in a metal bed, he probably sleeps on tin; he squeezes his shaving cream, tooth paste and various salves and lotions from tin tubes; he consumes food from a tin can, a tin-lined refrigerator, or a tin kitchen cabinet, after it has been cooked in tin pans on a tin stove. His "silverware" may contain tin; the cook washes dishes in a sink containing tin, with water from a brass faucet, partly made of tin; his children play with tin toys and his cigarettes are wrapped in tin-foil. All this happens under a tin roof in a house that is cleaned by a tin carpet sweeper and heated by a tin furnace.

Automobiles Are "Tinny"

The newspaper or magazine one reads is printed with type metal containing tin. If one has an automobile, it is "tinny" whether one wants to admit it or not, for tin is used in the manufacture of numerous automobile parts. Or if one rides in a street car, one is surrounded by tin which is used in the body construction and in the electrical apparatus.

Tin is also used extensively in the manufacture of addressograph machines, bottle and jar caps, buttons, cream separators, metal ceilings, nickel plating, signs, fire extinguishers and novelties. Solder is nearly half tin while bearing metal contains about 80 per cent. Bronze is a mixture of tin and copper.

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SARAWAK (BORNEO) SOCIETY OCCUPYING A RING-SIDE SEAT AT A COCK-FIGHT

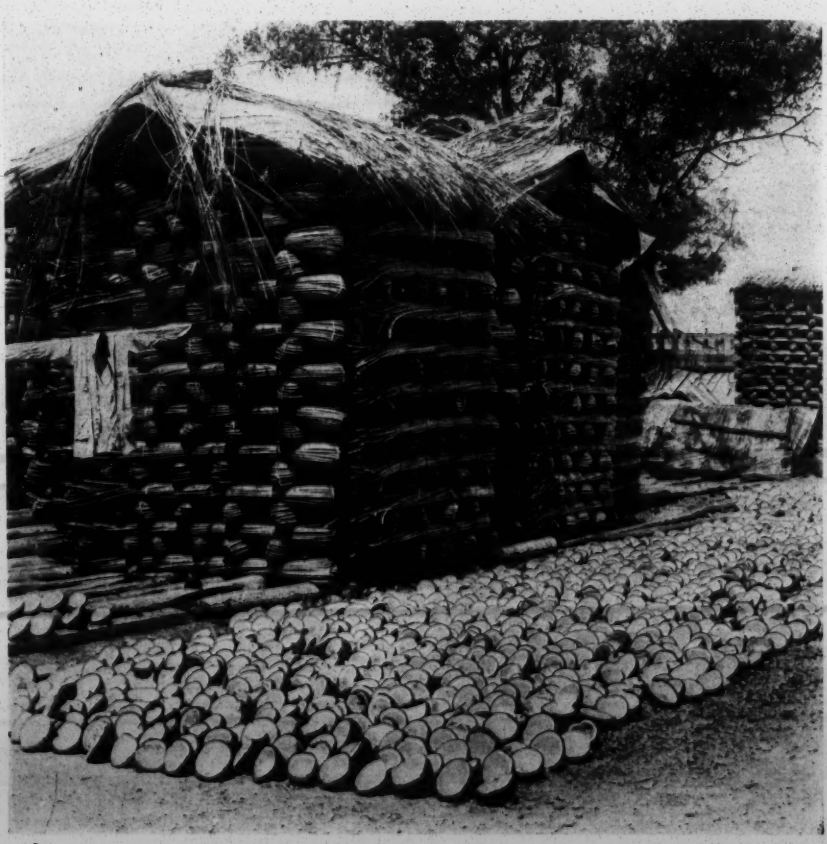
The onlookers are grouped on a platform at the end of a Dyak house, which is built high from the ground. The space beneath is utilized as a combination pigsty and chicken run. The family dog is on the platform. Cock-fighting is not tolerated in most civilized countries, but in Sarawak it is favored as being a marked advance over head-hunting (see Bulletin No. 5).

are also worn, and the costume is completed by a length of cloth folded around to form a short skirt.

Borneo is the second largest island in the world outside the Polar Regions, having an area of about 290,000 square miles, approximately that of Texas and West Virginia combined. Of this area the Netherlands owns more than 200,000 square miles; the remainder is controlled by Great Britain under three jurisdictions, British North Borneo, Brunei (or Borneo), and Sarawak. The latter has a romantic history. For three generations it has been ruled by "white Rajahs," members of a British family named Brooks, who are the hereditary rajahs.

Borneo is almost completely covered by a thick blanket of tropical verdure: valleys, hills and mountains alike. The density of the tangled mass of vegetation is equalled, probably, only in parts of the valley of the Amazon. Enormous forest trees grow close together, their tops interlacing and shutting out the sunlight. Smaller trees push far up, fighting for a place in the sun, while vines wrap themselves about the trunks and ferns fill the remaining space.

Bulletin No. 5, April 25, 1927.



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CHAIRS AND SOAP IN THE RAW

Rattan for commercial purposes varies in length from 5 to 35 feet and is tied in bundles for shipment. Since the time of Darwin's visit to the Cocos (Keeling) Islands in 1845, when he noted that coconuts were exported to Singapore "for local consumption as oil and for mixing in curries," the remainder of the world has discovered their value. From the sun- or kiln-dried meat, known to commerce as copra, is expressed a valuable oil, used in making oleomargarine, marine soap, and other commodities. The refuse makes a nutritious cake for dairy cows. Thus Singapore has become a major port for the shipment not only of rubber and tin but of this product of the coconut palm. Millions of the users of the product of the coconut palm never have seen the tree.